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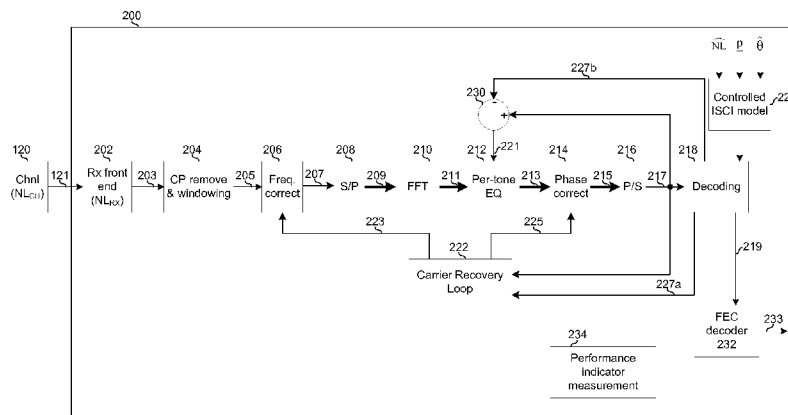


FIG. 2A

(57) Abstract: A transmitter may map, using a selected modulation constellation, each of  $C'$  bit sequences to a respective one of  $C'$  symbols, where  $C'$  is a number greater than one. The transmitter may process the  $C'$  symbols to generate  $C'$  inter-carrier correlated virtual subcarrier values. The transmitter may decimate the  $C'$  virtual subcarrier values down to  $C$  physical subcarrier values,  $C$  being a number less than  $C'$ . The transmitter may transmit the  $C$  physical subcarrier values on  $C$  orthogonal frequency division multiplexed (OFDM) subcarriers. The modulation constellation may be an  $N$ -QAM constellation, where  $N$  is an integer. The processing may comprise filtering the  $C'$  symbols using an array of  $C'$  filter tap coefficients. The filtering may comprise cyclic filtering. The filtering may comprise multiplication by a circulant matrix populated with the  $C'$  filter tap coefficients.

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## INTERNATIONAL SEARCH REPORT

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<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC(8) - H04L 1/00 (2014.01) USPC - 375/260 According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) USPC: 375/260  Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched USPC: 375/260, 295, 296, 298 (keyword limited - see terms below)  Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PatBase; GOOGLE; GoogleScholar; GooglePatents Search Terms: OFDM, orthogonal frequency division multiplexing, matrix, constellation, channel, QAM, filter, coefficient, SNR, signal to noise, receive, linear, nonlinear, virtual, subcarrier, mapping, modulation, symbol		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2011/0310823 A1 (Nam et al.) 22 December 2011 (22.12.2011), entire document, especially; abstract, para. [0011], [0037], [0041], [0044], [0045], [0047], [0050], [0073], [0152], [0182]	1 - 28
Y	US 2010/0074349 A1 (Hyllander et al.) 25 March 2010 (25.03.2010), entire document, especially; abstract, para. [0076], [0077]	1 - 28
Y	US 2007/0189404 A1 (Baum et al.) 16 August 2007 (16.08.2007), entire document, especially; abstract, para. [0054], [0058]	13 - 15, 23, 24
A	US 2011/0090986 A1 (Kwon et al.) 21 April 2011 (21.04.2011), entire document	1 - 28
A	US 2011/0164492 A1 (Ma et al.) 07 July 2011 (07.07.2011), entire document	1 - 28
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/>		
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